DOCUMENT RESUME

ED 387 644 CE 070 018

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TITLE Education for All Aspects of the Industry.
INSTITUTION National Center for Research in Vocational Education, Berkeley, CA.
SPONS AGENCY Office of Vocational and Adult Education (ED), Washington, DC.
PUB DATE 95
NOTE 7p.; For the full report from which this synthesis was drawn, see ED 377 328.
PUB TYPE Information Analyses (070) -- Collected Works - Serials (022)
JOURNAL CIT Centerfocus; n9 Fall 1995

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Academic Education; *Educational Needs; *Education Work Relationship; *Employer Attitudes; Employment Practices; Fashion Industry; Futures (of Society); *Integrated Curriculum; Labor Needs; Postsecondary Education; Printing; School Business Relationship; *Technical Education; *Vocational Education

ABSTRACT

Education for all aspects of the industry (AAI) is a strategy that is being advocated by education reformers to combine learning and experience, integrate vocational and academic education, develop more interdisciplinary instruction, and forge more links between schools, business, and the community. A study examined AAI from the perspective of the workplace, focusing on the interaction between postsecondary programs and the industries that employ their graduates. The objective of the research was to assess the extent to which education reform might promote new types of work organization or be slowed down by a perception on the part of educators that firms do not want these new types of skills. For this study, the printing industry and the fashion apparel industry, both fast-changing areas, were studied. The study found that, although the perception that broader knowledge and skills are advantageous for the emerging workplace is one of the key justifications for AAI, demand for workers with the skills learned in AAI programs is mixed. The development of AAI may be caught in a vicious circle in which employers are not interested because their labor force is not appropriately trained, and schools have no incentive to implement AAI because they perceive no demand from employers. However, the study concluded that the AAI strategy may still be justified on the basis of its pedagogic benefits and its effect on the ability of students to negotiate an increasingly fluid and uncertain labor market. (KC)

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Number 9 / Fall 1995
centerfocus

Education for All Aspects of the Industry

Education reformers are trying to bring about a wide range of changes in schools. They want to combine learning and experience; integrate vocational and academic education; develop more interdisciplinary instruction; forge links between schools, businesses, and community institutions; and avoid narrow training—all with the goal of preparing students for a variety of activities and a fast-changing workplace. Education for all aspects of the industry (AAI) is a strategy that seeks to achieve all of these objectives.

Programs that emphasize AAI explore the context in which vocational skills are used. For example, auto mechanics is taught as part of a transportation program. In addition to the specific skills needed for a particular occupation, students are taught the history of the industry and general technological principles important to it. Students also learn about planning, project development, teamwork, communications, and other work-related skills.

The AAI approach has three justifications. The first is pedagogic: learning is more effective when vocational education is integrated with instruction about the context in which graduates will work. Second, since long-term employment with one firm is increasingly unlikely, young people need broad skills that will prepare them to do a variety of jobs. The third argument for AAI emphasizes the interests of employers and their increased demand for higher-skilled workers: given the particular evolution of the nature and organization of work, students educated in AAI will be increasingly more effective employees. Thus, an AAI approach will serve the learning and career needs of students and the evolving needs of their future employers as well.

Rather than the low-skill, high-control system that is characteristic of mass production, the new economic environment favors integrating traditionally separate functions (engineering, marketing, manufacturing), flattening organizations, decentralizing responsibility, and increasing employee involvement. While the traditional system has advantages in terms of control and reduced training and skill needs, the newer system is more responsive and flexible and more conducive to continuous innovation.

A workforce with broad skills and knowledge can have many advantages. Changes in the economy favor producers who are able to turn out a variety of goods quickly, without large inventories of supplies. To do that, the producer's suppliers must be able to deliver high-quality inputs just as quickly. One solution is the development of networks or partnerships among firms in the supply chain, with companies in the chain coordinating their production rather than maintaining arms-length relationships. If these companies cooperate effectively, each can enjoy the advantages of a responsive supply pipeline while concentrating on its function within that process. This type of interaction among firms requires that workers have a clear understanding of the functions and problems of the other firms with which they are interacting—precisely the type of understanding that an AAI-oriented education can provide.

This *Centerfocus* is drawn from a research study that was conducted to examine the current status of AAI. The study evaluated the extent to which employers in the apparel and printing industries are implementing production systems that call for broader knowledge of the industry and of the context in which work takes place. The study also examined educational programs designed explicitly to serve those industries.

The Industries

The printing and apparel industries were chosen for the study because, in both, technological and market changes appear to give advantages to broader knowledge. Significant changes in the relations between producers and their customers have blurred previous distinctions. In printing, for example, desktop publishing and digital printing processes could transform the occupational structure within the industry and significantly blur existing market segmentation. Perhaps more remarkable, with the new technologies, some customers have the ability to publish high-quality materials themselves, forcing printers to compete with their own customers. In the apparel industry, market changes have promoted more interactive relationships between producers and retailers, with implications for the nature of the jobs of workers within each of those sectors.

The Schools

The focus of the study was from the point of view of the workplace. For that reason, educational programs were chosen that were designed to prepare students to enter the workforce directly (or perhaps to train them after they were already in the workforce). For the most part, the programs studied are in postsecondary institutions. Furthermore, these schools and programs were designed to focus on the needs of the two industries being studied.

The schools studied include the printing apprenticeship program organized by the Graphic Communications International Union School, the Don Bosco Technical Institute (offering high school and associate's degrees in printing or graphic arts), the fashion/apparel program at Los Angeles Trade and Technical College, the apparel education programs associated with North Carolina State University and El Paso Community College, and the New York Fashion Institute of Technology.

Because of the long-standing ties of these schools to the industries they serve, if the industries called for broader, more industry-oriented education, there would be pressure on these particular schools to move in that direction. These schools are often focused on turning out students with specific, narrowly defined skills who can get jobs immediately.

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Thus, the sites selected for this study offered an opportunity to observe the tension between the perception that industry wants broader skills and the more immediate exigencies of the job market.

This report examines AAI from the perspective of the workplace, focusing on the interaction between postsecondary programs and the industries that employ their graduates. The objective of the research was to assess the extent to which education reform might (1) promote new types of work organization or (2) be slowed down by a perception on the part of educators that firms do not want these new types of skills.

This report deals with four broad questions:

1. How strong is the demand for AAI knowledge and skills in the workplace?
2. To what extent is AAI reflected in the curricula and educational strategies of schools and training programs that prepare students for the workplace?
3. What are the barriers to wider development and diffusion of AAI strategies in schools?
4. What additional public policy and research can help educators and employers overcome the barriers to AAI?

How Strong is the Demand for AAI in the Workplace?

Both industries examined in this study have undergone and continue to experience major economic changes that favor an AAI approach. The forces encouraging change may be stronger in the printing industry than in apparel, but both face frequent market shifts, rapid technological development, and new forms of relationships among and within firms. Indeed, employers and their trade associations emphasize the need for innovative organizational reform and associated broad training.

But despite support and enthusiasm for innovative organizational reform, adoption of new approaches to production has been slow. While many employers express an interest in workers with broader skills and knowledge, most workplaces continue to be organized in such a way that broader skills and knowledge are not essential. AAI is not a central feature of the training offered by employers in these two industries. For many employers, the advantages of work reorganization and broader training are outweighed by the short-term costs associated with this strategy.

Three broad barriers to the introduction of innovative work organization and the broader training that would accompany it are

- concerns about the labor supply
- the short-term demands of day-to-day production
- the strength of traditional divisions that would be threatened by innovative work organization and associated AAI training.

To What Extent is AAI Reflected in Schools and Training Programs?

Administrators and staff at each of the educational institutions examined in this study expressed interest in and commitment to broader training, but some have made more progress than others. Short-term programs designed to prepare production workers for particular technologies or occupations are the least likely to have incorporated broader material in their curricula. Programs that need to teach a demanding set of technical skills, such as the fashion design departments at L.A. Trade Tech and the Fashion Institute of Technology, also have trouble including broader instruction.

The staff in these programs believe that their students could benefit from elements of an AAI approach. Nevertheless, they have an acute sense of the tradeoffs that they would need to make to substantially broaden their offerings. For the most part, education in the institutions that were studied is organized along traditional occupational lines.

Of the schools examined, the Don Bosco Technical Institute has perhaps made the most progress. One important factor is that the schools's administrators decided to sacrifice some short-term preparation to pursue a more general strategy. The tradeoffs were eased because most of this schools' graduates go on to higher-level technical or managerial positions. Indeed, educators, as well as employers, are much more likely to take an AAI approach for managerial training than for the preparation of production workers.

What are the Barriers to Wider Development and Diffusion of AAI in Schools?

Why have educators had difficulty implementing an educational strategy that enjoys such widespread support? Three broad problems stand in the way.

The Educational Preparation of Incoming Students. AAI may in fact be an effective strategy for teaching basic skills to students who have had problems with other pedagogic approaches. But educators complain that many students simply do not come in with sufficient basic skills to handle a broader, more sophisticated, and more conceptual curriculum. From this perspective, the ability to select their student body is one reason schools such as the Don Bosco Technical Institute have been able to make more progress towards an AAI approach than many other institutions.

The Conflict Between Concrete Short-Term Needs and More Amorphous Long-Run Benefits. Like employers, educators face a tradeoff between short-term demands and the long-term benefits of AAI. This is particularly true of such programs as fashion design, which have demanding technical skills to teach. The longer-term benefits of AAI education seem less significant to educators when they believe that they would have to eliminate the teaching

of necessary skills in order to broaden the curriculum.

Employer demands clearly contribute to the tension between an AAI strategy and short-term needs. Indeed, some educators believe that a thorough AAI approach would prepare their graduates for jobs in the next decade, but not for many jobs available now. For example, many graphic arts employers still look for graduates with stripping and photographic skills that will be obsolete in a few years. The slow development of AAI-based work organizations sends educators signals that are at best conflicting; at worst, they suggest that industry does not really want broad-based skills or reorganized workplaces.

Traditional Categories and Divisions Threatened by AAI. Traditional academic organization and the associated turf battles threaten the development of AAI. Union-management conflicts bedevil other training programs. In some industries, continuing conflict between unions and employer associations has simply closed off AAI as a training approach.

Conclusion. Both educators and employers are more convinced about the need for broader education for managers not directly involved with production than they are for production workers. But graduates who have no more than a high school diploma are now unlikely to find employment other than in unskilled low- paying jobs. Since finding good jobs will require postsecondary training, high schools will be increasingly insulated from the tradeoffs between broad training and the immediate needs of local employers. Therefore, AAI may be particularly suited for secondary schools.

This suggests that the strongest justifications for AAI are career preparation and pedagogy. Indeed, the effect of employer demand on the spread of AAI is mixed. Although models of more effective work organizations appear to work best with more broadly educated workers, many employers continue to adhere to a more traditional approach to production and seem to prefer employees with traditional skills, even, in some cases, with skills that will soon be obsolete.

It is possible that if the workforce generally had broader skills, employers would move more quickly to innovative ways of production. But weak labor force skills are only one reason employers cling to traditional means. Nevertheless, the possible encouragement to production innovation does justify pushing ahead with AAI in schools, despite lukewarm employer interest. Added to the pedagogic benefits, which do not depend on employer demand, this offers strong grounds for support of AAI educational reform.

What Can Help Overcome the Barriers to AAI?

How can the three broad barriers be overcome?

The Educational Preparation of Incoming Students. The weakness of entering students is a broad educational problem. Sophisticated and demanding educational approaches at the upper-secondary or postsecondary level must be built on a solid foundation of basic skills. But if AAI can be shown to be an effective pedagogy for junior high or early secondary school students, then a strategy that emphasizes AAI as a basic approach to teaching may itself help prepare high school students for more employer-oriented AAI programs in later years.

The Conflict Between Concrete Short-Term Needs and More Amorphous Long-Term Benefits. Both in workplaces and in schools, the benefits of AAI often appear to be luxuries in the context of the day-to-day demands of production and of the need to have students graduate with immediately useful skills. There are three main approaches to solving this dilemma:

1. Strengthening the understanding of the benefits of AAI. If planners had a more concrete measure of the benefits, the tradeoffs necessary to broaden the curriculum might appear more favorable. Thus, what is needed is an evaluation that examines the effects of AAI on skills, future earnings, and career paths compared to other educational reform proposals. Researchers need also to provide concrete measures of how broader knowledge and skills benefit businesses.

2. Developing pedagogic techniques that simultaneously teach the needed specific skills as well as broader knowledge. This is a fundamental goal of the integration of vocational and academic education. AAI is one vehicle for achieving that integration. Thus, continuing progress on integration will also help overcome barriers to AAI.

AAI is closest to the integration approach when it is used in high schools to teach academic skills: practical material is designed to promote the learning of academic skills. But once programs are designed to teach immediately useful skills, it becomes more difficult to avoid the conflict and the resulting compromises. A great deal more thought needs to be given to designing pedagogic strategies that minimize the conflicts and tradeoffs.

3. Ultimately, some tradeoffs will be necessary. Educators are trying to accomplish more with AAI than they were with more traditional approaches; it is reasonable to expect that this will take more time. More time can be found either by starting earlier or by keeping students in school longer.

Starting AAI earlier in high school or middle school fits with the general pedagogic strengths of AAI. But if the strategy is designed to teach students about specific industries, this may require students to make decisions earlier. In the US, any program that is believed to require early tracking is likely to run into serious political opposition. Educators will have to emphasize the general nature of AAI education, and early or pre-high school AAI will have to use general industrial categories such as "transportation."

To ease the conflict between specific skills and broader knowledge,

the staff of the design program at Fashion Institute of Technology is discussing whether to de-emphasize its two-year programs and expand the four-year programs. This is not an obvious approach since two-year students often have employment opportunities before they graduate. A better understanding of the benefits of AAI is needed in order to make decisions about expanding schooling time and increasing resources of the schools.

Traditional Categories and Divisions Threatened by AAI. In several cases, the strength of traditional divisions has thwarted the development of AAI. Sometimes organizational solutions are possible. The Don Bosco Technical Institute has been able to make progress because of its strong local leadership. But breaking through traditional departmental and divisional barriers is a political issue, and consolidations usually generate tremendous opposition from faculty members.

Educators and employers are most likely to be able to overcome these types of problems if the incentives are strong enough. If the benefits of AAI are clearly understood, or if employers begin to strongly favor graduates of AAI-oriented programs, schools will have stronger reason to change. Some additional categorical subsidies or other financial assistance may also help break through traditional barriers.

Conclusions and Recommendations

The perception that broader knowledge and skills are advantageous for the emerging workplace is one of the key justifications for AAI. Yet demand for workers with the skills learned in AAI programs is mixed. However, the strategy may still be justified on the basis of its pedagogic benefits and its effect on the ability of students to negotiate an increasingly fluid and uncertain labor market.

Active interest by employers would be key to a sustainable development of the strategy. But the development of AAI may be caught in a vicious circle in which employers are not interested because their labor force is not appropriately trained, and schools have no incentive to implement AAI because they perceive no demand from employers. Given this dilemma, it makes sense to consider policy approaches based on coordinated activities of employers and schools.

In both the printing and apparel industries, there are industry-oriented schools with close ties to local employers. The schools could offer training and technical assistance to firms to help them develop more innovative organizational strategies. Firms could work with schools to develop broader curricula and help educators decide what short-term material might be reduced to make room for broader information. Schools and employers could work together to ease the short-term/long-term conflict by incorporating more AAI material into the training that workers receive from their employers or from equipment vendors.

The central point is that neither employers nor schools have to take the exclusive lead. The public sector could act as a catalyst to encourage schools and employers to work together to achieve goals that might elude either set of institutions working alone. For example, the public sector could fund conferences explicitly designed to discuss the benefits of a broader curriculum and to make joint plans.

In conclusion, despite the wide support for AAI by both employers and educators, only limited progress has been made. This is not surprising given the serious barriers that confront the AAI approach. Even if schools and workplaces would benefit from an expansion of AAI, those benefits would not accrue to either one acting alone. Without a conscious program of change, progress will be slow at best. This creates a clear case for a public policy program of research, demonstration, and financial and technical assistance to help determine the ultimate potential for the strategy and to increase the chances that it will live up to that potential.

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This brief was developed at the Institute on Education and the Economy, Teachers College, Columbia University, which is part of the National Center for Research in Vocational Education. This synthesis was drawn from an NCRVE report entitled *Education for All Aspects of the Industry: Overcoming Barriers to Broad-Based Training*, reference number MDS 243.

This publication was published pursuant to a grant from the Office of Vocational and Adult Education, U.S. Department of Education, authorized by the Carl D. Perkins Vocational Education Act

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This publication was published pursuant to a grant from the Office of Vocational and Adult Education, U.S. Department of Education, authorized by the Carl D. Perkins Vocational Education Act

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